

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A method in a data processing system for validating digital certificates having a server, an Online Certificate Status Protocol (OCSP) responder, a certificate authority, and a certificate database including records associated with digital certificates, comprising:

receiving, at the OCSP responder, an ~~online certificate status protocol~~ OCSP request associated with a digital certificate generated by the server;

creating, by the OCSP responder, a Lightweight Directory Access Protocol database query based on the received OCSP request;

sending, by the OCSP responder, the Lightweight Directory Access Protocol database query to the certificate database to determine whether the digital certificate is valid; and

receiving, at the OCSP responder, a database query result indicating whether the digital certificate ~~is valid~~ matches a corresponding certificate entry stored in one of the certificate database records;

determining, by the OCSP responder, the validity of the digital certificate based on the database query result; and

notifying the server of the determined validity of the digital certificate.

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2. (Currently Amended) The method of claim 1, ~~further including sending an indication of whether the digital certificate is valid based upon the received database query result~~ wherein the Lightweight Directory Access Protocol database query includes an instruction to return a selected portion of a database record.

3. (Currently Amended) The method of claim 1, ~~wherein the data processing system has a certificate authority and an associated database, and wherein the method further comprises:~~

sending an indication of a new digital certificate from the certificate authority to the certificate database upon issuance of the new digital certificate;

receiving, by the certificate database, from the certificate authority, an indication of the new digital certificate; and

~~storing~~ creating a certificate database record reflecting an identity of the new digital certificate.

4. (Currently Amended) The method of claim 1, ~~wherein the data processing system has a certificate authority and an associated database, and wherein the method further comprises:~~

sending an indication of a revoked digital certificate from the certificate authority to the certificate database upon revocation of the revoked digital certificate;

receiving, by the certificate database, from the certificate authority, the indication of revocation of the revoked digital certificate; and

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removing a certificate database record of an identity of associated with the
revoked digital certificate from the certificate database.

5. (Currently Amended) A method in a data processing system for validating
digital certificates, the data processing system having a certificate authority and ~~an~~
~~associated~~ a directory server having a database, the method performed by the directory
server comprising:

receiving, ~~by a database,~~ a Lightweight Directory Access Protocol query based
on an online certificate status protocol request indicating a requested digital certificate;

searching the database for a database record reflecting an identity of the
requested digital certificate; and

returning an indication of the database record when the database record
reflecting the requested digital certificate is found to indicate validity of the requested
digital certificate, whereby the indication of the database record ~~is returned without~~
~~transmission of a certificate revocation list by the certificate authority~~ includes meta-data
reflecting the validity of the requested digital certificate.

6. (Currently Amended) The method of claim 5, further comprising ~~the step~~
~~of~~:

sending an indication of a new digital certificate from the certificate authority to
the database upon issuance of the new digital certificate;

receiving, by the database from the certificate authority, an indication of the new
digital certificate upon issuance of the new digital certificate; and

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storing a database record reflecting an identity of the new digital certificate.

7. (Currently Amended) A method in a data processing system for validating digital certificates without certification revocation lists, comprising:

receiving, from a server, an online certificate status protocol request associated with a digital certificate;

creating a database query based on the received request;

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sending the database query to a database to determine whether the digital certificate is valid; and

receiving a database query result indicating that ~~whether~~ the digital certificate is ~~valid~~ matches an entry in the database;

providing the database query result to the server that determines that the digital certificate is valid based on the indication of the matching database entry; and

sending, from the server to a digital certificate requesting entity, an indication that the digital certificate is valid.

8. (Original) The method of claim 7, wherein the database query is a Lightweight Directory Access Protocol database query.

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9. (Currently Amended) A method in a data processing system for validating digital certificates without certification revocation lists, the data processing system having a requesting entity that requests a status of a digital certificate from a remote computing entity, a certificate authority, and an associated a database, the method comprising:

receiving, by the database, a query based on an online certificate status protocol request indicating a requested digital certificate, wherein the request is generated by the remote computing entity based on a status request received from the requesting entity;

searching the database for a database record reflecting an identity of the requested digital certificate; and

returning ~~an~~ a first indication of the database record when the database record reflecting the requested digital certificate is found in the database; and to indicate validity of the requested digital certificate

returning a second indication of the database record when the database record reflecting the requested digital certificate is not found in the database,

wherein the remote computing entity determines that the digital certificate is valid when the first indication is returned and determines that the digital certificate is invalid when the second indication is returned; and

sending, from the remote computing entity to the requesting entity, a third indication reflecting the invalidity or validity of the digital certificate.

10. (Currently Amended) The method of claim 9, further comprising ~~the step~~ of:

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sending an indication of the new digital certificate from the certificate authority to the database upon issuance of the new digital certificate;

receiving, by the database from the certificate authority, an indication of a new digital certificate upon issuance of the new digital certificate; and

storing a database record reflecting an identity of the new digital certificate.

11. (Original) The method of claim 9, wherein the received query is a Lightweight Directory Access Protocol query.

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12. (Currently Amended) A method in a data processing system for validating digital certificates without certification revocation lists, the data processing system having a client, a server, ~~an OCSP~~ a responder, a certificate authority, and a database storing records of valid digital certificates of the certificate authority ~~and a certificate authority~~, the method comprising:

generating, by the client, a request from the client for a transaction, the request including a digital certificate identifying the client;

receiving the client request by the server;

creating, by the server, an online certificate status protocol request based on the associated digital certificate identifying the client;

sending, by the server, the online certificate status protocol request ~~by the server to the responder~~;

receiving, by the ~~OCSP~~ responder, the online certificate status protocol request associated with the digital certificate;

creating, by the responder, a Lightweight Directory Access Protocol database query based on the received online certificate status protocol request;

sending, by the responder, the Lightweight Directory Access Protocol database query to the database to determine whether the digital certificate is valid, ~~the database storing records of valid certificates of the certificate authority~~;

searching the database for a database record identifying the digital certificate associated with the online certificate status protocol request;

returning a LDAP database query result indicating whether the digital certificate is valid the database record is stored in the database; and

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sending, by the responder, a validity indication whether the digital certificate is valid based on the query result to the server; and

sending, by the server to the client, an indication of whether the transaction is authorized based on the validity indication ~~receiving the returned LDAP database query result.~~

13. (Currently Amended) A data processing system for answering online certificate status requests without certificate revocation lists, comprising:

a memory having program instructions;

a processor configured to execute the program instructions to receive from a server an online certificate status protocol request associated with a digital certificate, create a database query based on the received request, send the Lightweight Directory Access Protocol database query to a database to determine whether the digital certificate is valid, ~~and~~ receive a Lightweight Directory Access Protocol database query result from the database indicating whether the digital certificate matches a corresponding entry stored in a database one of the certificate database records, determining the validity of the digital certificate based on the database query result, and notify the server of the determined validity of the digital certificate is valid.

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14. (Original) A data processing system for answering online certificate status requests without certificate revocation lists, comprising:

a first computer having:

a memory having program instructions;

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a processor configured to execute the program instructions to receive an online certificate status protocol request associated with a digital certificate, create a database query based on the received request, send the database query to determine whether the digital certificate is valid, and receive a database query result indicating whether the digital certificate is valid; and

a second computer representing a directory server having:

a database storing database records indicating digital certificates;

a memory having program instructions;

a processor configured to execute the program instructions to receive, from a certificate authority, an indication of a new digital certificate upon issuance of the new digital certificate, store a database record reflecting an identity of the new digital certificate, receive the database query based on the online certificate status protocol request from the first computer, search the database for a database record reflecting an identity of the requested digital certificate; and return an indication of the database record to the first computer when the database record reflecting the requested digital certificate is found to indicate validity of the requested digital certificate.

15. (Original) The data processing system of claim 14, wherein the database query is an LDAP query.

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16. (Currently Amended) A data processing system for answering online certificate status requests without certificate revocation lists, comprising:

a client computer configured to send a request for a transaction, the request including a digital certificate identifying the client;

a server computer configured to receive the client request, create an online certificate status protocol request based on the associated digital certificate identifying the client, and send the online certificate status protocol request;

an OCSP responder configured to receive the online certificate status protocol request associated with the digital certificate, create a Lightweight Directory Access Protocol database query based on the received online certificate status protocol request, and send the Lightweight Directory Access Protocol database query to a database to determine whether the digital certificate is valid, ~~the database storing records of valid certificates of the certificate authority;~~ and

a database storing records of valid certificates of the certificate authority and configured to search for a database record identifying the digital certificate associated with the online certificate status protocol request, return an LDAP database query result indicating whether the digital certificate matches one of the records stored in the database, is valid

wherein the OCSP responder determines that the digital certificate is valid when it receives an LDAP database query result reflecting that the digital certificate matches one of the database records.

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17. (Currently Amended) A computer-readable medium containing instructions for controlling a data processing system to perform a method for validating digital certificates, the data processing system having a server, an Online Certificate Status Protocol (OCSP) responder, a certificate authority, and a certificate database including records associated with digital certificates, the method comprising the steps of:

receiving, at the OCSP responder, an ~~online certificate status protocol~~ OCSP request associated with a digital certificate generated by the server;

creating, by the OCSP responder, a Lightweight Directory Access Protocol database query based on the received OCSP request;

sending, by the OCSP responder, the Lightweight Directory Access Protocol database query to the certificate database to determine whether the digital certificate is valid; and

receiving, at the OCSP responder, a database query result indicating whether the digital certificate ~~is valid~~ matches a corresponding certificate entry stored in one of the certificate database records;

determining, by the OCSP responder, the validity of the digital certificate based on the database query result; and

notifying the server of the determined validity of the digital certificate.

18. (Currently Amended) The computer-readable medium of claim 17, wherein ~~the method further comprises sending an indication of whether the digital certificate is valid based upon the received database query result~~ the Lightweight Directory Access

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Protocol database query includes an instruction to return a selected portion of a database record.

19. (Currently Amended) The computer-readable medium of claim 17, ~~wherein the data processing system has a certificate authority and an associated database, and~~ wherein the method further comprises:

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sending an indication of a new digital certificate from the certificate authority to the database upon issuance of the new digital certificate;

receiving, by the database, from the certificate authority, an indication of the new digital certificate; and

storing a database record reflecting an identity of the new digital certificate.

20. (Currently Amended) The computer-readable medium of claim 17, ~~wherein the data processing system has a certificate authority and an associated database, and~~ wherein the method further comprises:

sending an indication of a revoked digital certificate from the certificate authority to the database upon revocation of the revoked digital certificate;

receiving, by the database, from the certificate authority, the indication of revocation of the revoked digital certificate; and

removing a database record of an identity of the revoked digital certificate.

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21. (Currently Amended) A computer-readable medium containing instructions for controlling a data processing system to perform a method for validating digital certificates, the data processing system having a certificate authority and a directory server having an associated database, the method performed by the directory server comprising the steps of:

receiving, ~~by a database~~, a Lightweight Directory Access Protocol query based on an online certificate status protocol request indicating a requested digital certificate;

searching the database for a database record reflecting an identity of the requested digital certificate; and

returning an indication of the database record when the database record reflecting the requested digital certificate is found to indicate validity of the requested digital certificate, whereby the indication of the database record ~~is returned without transmission of a certificate revocation list by the certificate authority~~ includes meta-data reflecting the validity of the requested digital certificate.

22. (Original) The computer-readable medium of claim 21, wherein the method further comprises the steps of:

sending an indication of a new digital certificate from the certificate authority to the database upon issuance of the new digital certificate;

receiving, by the database from the certificate authority, an indication of the new digital certificate upon issuance of the new digital certificate; and

storing a database record reflecting an identity of the new digital certificate.

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23. (Currently Amended) A computer-readable medium containing instructions for controlling a data processing system to perform a method for validating digital certificates without certification revocation lists comprising the steps of:

receiving, from a server, an online certificate status protocol request associated with a digital certificate;

creating a database query based on the received request;

sending the database query to a database to determine whether the digital certificate is valid; ~~and~~

receiving a database query result indicating that whether the digital certificate is ~~valid~~ matches an entry in the database;

providing the database query result to the server that determines that the digital certificate is valid based on the indication of the matching database entry; and

sending, from the server to a digital certificate requesting entity, an indication that the digital certificate is valid.

24. (Original) The computer-readable medium of claim 23, wherein the database query is a Lightweight Directory Access Protocol database query.

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25. (Currently Amended) A computer-readable medium containing instructions for controlling a data processing system to perform a method for validating digital certificates without certification revocation lists, the data processing system having a requesting entity that requests a status of a digital certificate from a remote computing entity, a certificate authority and an associated a database, the method comprising the steps of:

receiving, by the database, a query based on an online certificate status protocol request indicating a requested digital certificate, wherein the request is generated by the remote computing entity based on a status request received from the requesting entity;

searching the database for a database record reflecting an identity of the requested digital certificate; and

returning an a first indication of the database record when the database record reflecting the requested digital certificate is found in the database; and to indicate
~~validity of the requested digital certificate~~

returning a second indication of the database record when the database record reflecting the requested digital certificate is not found in the database,

wherein the remote computing entity determines that the digital certificate is valid when the first indication is returned and determines that the digital certificate is invalid when the second indication is returned; and

sending, from the remote computing entity to the requesting entity, a third indication reflecting the invalidity or validity of the digital certificate.

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26. (Original) The computer-readable medium of claim 25, wherein the method further comprises the steps of:

sending an indication of the new digital certificate from the certificate authority to the database upon issuance of the new digital certificate;

receiving, by the database from the certificate authority, an indication of a new digital certificate upon issuance of the new digital certificate; and

storing a database record reflecting an identity of the new digital certificate.

27. (Original) The computer-readable medium of claim 25, wherein the received query is an Lightweight Directory Access Protocol query.

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28. (Currently Amended) A computer-readable medium containing instructions for controlling a data processing system to perform a method for validating digital certificates without certification revocation lists, the data processing system having a client, a server, an OCSP responder, a certificate authority, and a database storing records of valid digital certificates of the certificate authority ~~and a certificate authority~~, the method comprising the steps of:

sending generating, by the client, a request ~~from the client~~ for a transaction, the request including a digital certificate identifying the client;

receiving the client request by the server;

creating, by the server, an online certificate status protocol request based on the associated digital certificate identifying the client;

sending, by the server, the online certificate status protocol request ~~by the server~~ to the responder;

receiving, by the OCSP responder, the online certificate status protocol request associated with the digital certificate;

creating, by the responder, a Lightweight Directory Access Protocol database query based on the received online certificate status protocol request;

sending, by the responder, the Lightweight Directory Access Protocol database query to the database to determine whether the digital certificate is valid, ~~the database storing records of valid certificates of the certificate authority~~;

searching the database for a database record identifying the digital certificate associated with the online certificate status protocol request;

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returning a LDAP database query result indicating whether the digital certificate
is valid the database record is stored in the database; and

sending, by the responder, a validity indication whether the digital certificate is
valid based on the query result to the server; and

sending, by the server to the client, an indication of whether the transaction is
authorized based on the validity indication ~~receiving the returned LDAP database query~~
result.

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29. (Currently Amended) A data processing system for validating digital certificates, comprising:

means for receiving an ~~online certificate status protocol~~ OCSP request associated with a digital certificate generated by a server;

means for creating a Lightweight Directory Access Protocol database query based on the received OCSP request;

means for sending the Lightweight Directory Access Protocol database query to a certificate database including records associated with digital certificates to determine whether the digital certificate is valid; and

means for receiving a database query result indicating whether the digital certificate ~~is valid~~ matches a corresponding certificate entry stored in one of the certificate database records;

means for determining the validity of the digital certificate based on the database query result; and

means for notifying the server of the determined validity of the digital certificate

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